The vascular center: A model for multidisciplinary delivery of vascular care for the future

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BACKGROUND

The 1990s have ushered in the development of new technologies for the treatment of vascular disease at an unsurpassed pace. At the same time, changes in the regulatory and economic aspects of medical practice have created unprecedented competitive pressures in the field of vascular care. These pressures have added fuel to an ever-smoldering turf struggle between specialists who are interested in this field, most notably vascular surgeons, interventional radiologists, and cardiologists, although a few vascular medicine specialists have also joined the fray. The overt result has been an uninhibited expression of opinions coupled with hostile rhetoric, through which the perceived roles, responsibilities, and privileges of the various disciplines have been expressed. Heated credentialing battles driven by a fear of obsolescence have occurred in hospitals throughout the country. Just as these occupational pressures create the potential for conflict between individuals, practices, and entire specialties, so too do they create an ideal opportunity for creative solutions.

It has been our observation in over 30 combined man-years of university and community practice that hotly contested turf wars are won and lost at great cost. The usual outcome is a hostile environment and the lack of a clear winner. More often than not, everyone involved in the struggle loses in the end, including the patients. The following discussion describes the potential for the interdisciplinary practice of vascular therapy and lays the groundwork for the development of vascular centers, which we believe represent the optimal practice environment for the future.

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The model of a vascular institute that integrates the knowledge, skills, and practices of the various physicians involved in the care of cardiovascular patients is one that has worked for us at the Miami Vascular Institute (MVI). Simply stated, the mission of the MVI is to provide the best in the diagnosis, treatment, and prevention of cardiovascular diseases. Pursuit of the goals directed toward this mission has required and continues to require physician leadership, a visionary hospital board and administration, a hospital medical staff whose trust has been earned, and major commitments primarily to patient care, but also to teaching and research. In the 8 years since the MVI was founded, all of our plans, policies, procedures, and accomplishments in patient care and research have been outgrowths of our mission and of the commitment of physicians from all cardiovascular disciplines. Our patients have been the principal beneficiaries.

FACTORS FAVORING THE DEVELOPMENT OF VASCULAR CENTERS

Vascular surgeons and interventional radiologists are particularly well-suited and positioned to combine efforts and create solutions to suit both their needs and those of their patients with vascular disease. Prominent among the factors that make this true are: (1) a common patient base that reflects a common commitment to vascular disorders; (2) complementary skills; (3) a common interest in emerging technologies (this is particularly true in the field of endovascular therapies); (4) a common set of reporting standards in peripheral arterial disease[1]; (5) an increasing tendency for large purchasers of health care services to purchase these services as a package (cardiovascular or vascular care services)[2]; (6) an increase in mergers between practices, which, although basically defensive in origin, has great potential for spawning creative and productive partnerships (although most mergers represent horizontal integration, i.e., combined practices within the same specialty, vertical integration across specialties is likely to

increase in the future); and (7) a movement currently afoot within the American Board of Medical Specialties to do away with certificates of added qualifications and special qualifications and replace them with a subcertification process that would enable holders of primary certification under one board to receive subcertification under another.

It is useful to examine the above seven factors for their current and potential future impact. As we do so, we will refer frequently to conditions at MVI.

Common patient base. In most hospitals, interventional radiologists and vascular surgeons cooperate and collaborate in the management of patients with vascular disease. In general, patients who are referred to the radiology suite for endovascular therapy are referred by vascular surgeons. In some institutions, however, including ours, direct referrals to the vascular and interventional radiologist by primary care specialists, subspecialty internists, and others comprise a significant proportion of the interventional practice. This in turn has made referrals to vascular surgeons by interventional radiologists an increasingly common practice. It has been our observation that primary care physicians often delay referral to vascular surgeons, whom they tend to associate with only surgical options in therapy. In institutions such as ours, where interventional radiologists receive direct referrals from primary care physicians, vascular surgical consultation is often first suggested by the interventionalist. A guiding principle of our work environment is that the least-invasive therapeutic options will be applied whenever possible and appropriate. One of the major advantages of our close interdisciplinary working relationship has been the development of a mutual understanding of each specialty's knowledge and skills and an appreciation for when they should be applied.

When an interventionalist is the attending physician, it is common practice for him or her to obtain a vascular surgical consultation. At the time of the consultation, the surgeon begins to establish a relationship with the patient that endures throughout all subsequent admissions. When the time comes for a major vascular reconstruction, the physician-patient relationship has already been established, and the transition in care is seamless. Although many of the latter referrals entail diagnosis and management of peripheral arterial disease of the lower extremities, many others involve treatment of renovascular hypertension, vena cava syndromes, and an assortment of other problems.

From the above discussion, it is obvious that vascular surgeons are not the only subspecialists to whom patients with peripheral arterial disease are referred. In some institutions, the cardiologist is the first subspecialist to evaluate the patient who has symptoms or signs of peripheral arterial disease. In a few institutions, vascular medicine specialists have assumed this role. Interventional radiologists may also be responsible for bringing new peripheral vascular disease patients into the health care system. It is imperative that all specialists who accept direct referrals of patients with peripheral vascular disease be knowledgeable and skilled in the diagnostic workup, epidemiology, natural history, and management of these patients, and in the detection and management of comorbid conditions, including coronary heart disease and cerebrovascular disease. Only in recent years have subspecialty training programs in vascular and interventional radiology begun to address these concerns. However, now that accreditation of vascular and interventional radiology training programs by the Accreditation Council for Graduate Medical Education is a reality (to date there are 62 in North America and more awaiting accreditation), and now that the American Board of Radiology is offering certifying examinations for added qualifications in vascular and interventional radiology (to date, approximately 1000 interventionalists have been certified), these educational issues will remain in the foreground.

It is important for interventionalists in all institutions to maintain a close working relationship with vascular surgeons. In this way, patients benefit from the knowledge and expertise of both subspecialists. At MVI both a surgeon and an interventionalist are involved in the management of nearly every patient with peripheral arterial disease, even when the patient is referred from elsewhere directly to interventional radiology. In general, the physician responsible for the patient's follow-up is the one (interventional radiologist or vascular surgeon) to whom the original referral was made. Exceptions include those patients in whom a major transition in care has occurred in the management process. An example in this category would be a patient who was referred by the primary physician for possible femoropopliteal angioplasty, but who ultimately underwent a femoropopliteal bypass procedure instead.

In patients with peripheral arterial disease, noninvasive vascular laboratory surveillance is performed at 3 months, 6 months, and 12 months, and then at yearly intervals after intervention or surgery in the Institute's Intersocietal Commission for the Accreditation of Vascular Laboratories–accredited lab. The lab is run by an interdisciplinary hospital committee. Readership positions are filled by election as volume-based readership positions become available. Privileges are granted on the basis of specialty, hospital

activity (adjusted admissions), compliance with continuing medical education requirements, and quality and accuracy of interpretation. For carotid studies, a reader must be a vascular surgeon, neurologist, or radiologist, who fulfills the other criteria. For the interpretation of peripheral vascular studies, a reader must be a vascular surgeon or interventional radiologist who fulfills the other criteria. The reading schedule rotates on a weekly basis. On a day-to-day, moment-to-moment basis, the lab is supervised by the hospital-based physicians.

Complementary skills. Given the generally well-educated population that MVI serves, patients often seek medical attention at a relatively early symptomatic stage of their disease. This is not to say that the disease is in an early stage. On the contrary, the disease is usually moderate to extensive, and something can be offered to almost every patient. The treatment philosophy at MVI is rather simple. Risk-factor reduction receives top priority, and monitored exercise is offered through our combined peripheral vascular and cardiac rehabilitation program to all patients with less than category 4 ischemic disease. Symptom thresholds for percutaneous intervention, however, are lower than those for surgery. When patients are candidates for invasive treatment and endovascular therapy is a reasonable option, patients almost always undergo endovascular therapy as the first line of treatment. MVI surgeons agree with this philosophy, and the collegial atmosphere has served our patients well. Surgical practices have also benefited by this approach. The increased number of patients in the system has led to a more than twofold increase in the annual number of major vascular reconstructions performed by MVI surgeons over the past 8 years.

This common treatment philosophy and collegial atmosphere have spawned other benefits that are real ized on a daily basis. For example, dealing with such issues as limb salvage, difficult access for transluminal intervention, elective surgical closure after percutaneous intervention, and the moment-to-moment deci sions on patients undergoing thrombolytic therapy followed by definitive therapy, has been rendered much simpler by virtue of our close working relationships.

Common interest in emerging technologies. The emerging endovascular treatment of aortic aneurysms, various pseudoaneurysms, and arteriovenous fistulae has created an opportunity for further cooperation. To interventional radiologists, these procedures represent an extension of skills long applied to angioplasty, stent deployment, embolization, infusion, intravascular ultrasonography, and other endovascular treatments. The patient population, however, is new. Never before has transcatheter therapy been available for these patients. Aside from their role in the diagnostic imaging workup, never before have radiologists been involved with aortic aneurysm patients. Therefore, interventionalist investigators now involved in clinical endograft protocols have had to learn quickly about the epidemiology, natural history, and conventional surgical management of aortic aneurysms. Without this basic knowledge, investigators would be ill-equipped to counsel patients on the likelihood of complications both with and without treatment. Conversely, surgeons have always been involved in the treatment of aneurysm patients, but with a conventional epidemiologic and surgical approach. Now they are confronted with an entirely new method of therapy that, in general, requires surgical skills for access, but a different set of skills for safe and proper deployment of an endograft. These essential facts legitimize the roles of both subspecialists in the management of patients with aneurysms.

At MVI we have managed to develop a unique routine for handling endograft cases. We perform all of these procedures in a special endovascular suite that has been configured to serve as an operating room. The decision to perform all endograft procedures in the endovascular suite rather than in the operating room was based on the recognition that all of these procedures are extremely imaging-intensive and imaging-dependent. This decision has been universally accepted as an excellent one. The suite meets all of the requirements, including lighting, air exchanges, washable ceiling, seamless floor, traffic handling, and infection control. Cases are scheduled not only on the interventional radiology schedule, but also on the operating room and anesthesia schedules. For each case, all of the necessary equipment and personnel are assembled, and so far this arrangement has worked flawlessly, even for the four patients in whom abdominal incisions were required to complete the procedure. As more and more work is performed cooperatively in this fashion, creative professional relationships and billing arrangements will certainly evolve.

The suitability of the endovascular suite has led to a realization that various forms of combined treatment (in addition to endograft deployment) can and should be performed in such an optimal imaging environment. Thus interventionalists and surgeons have teamed up in the treatment of various types of patients, for example, those who require both iliac artery stent placement and the performance of bilateral common femoral endarterectomy and patch angioplasty.

Common set of reporting standards. In 1986, an ad hoc committee of the Joint Councils of the International Society for Cardiovascular Surgery

(ISCVS) and the Society for Vascular Surgery (SVS) identified a serious lack of uniformity in reporting in the vascular surgery literature that rendered interpretation across studies almost impossible. The committee formulated and published a suggested set of standards for reporting the results of studies concerning the treatment of peripheral arterial disease.[3] By 1991, it was clear that reports on endovascular therapy and those on conventional vascular surgical therapy for peripheral arterial disease should be held to the same standards because the patient populations and therapeutic goals overlap extensively. A set of standards that addressed this concern was published in a special supplement to *Circulation* in 1991.[4] A modified version was subsequently published the same year in both the *Journal of Vascular and Interventional Radiology*,[2] and *Radiology*.[5]

Increasing tendency for large purchasers of health care services to purchase services as a package. By now it is obvious to everyone that although patients may be the "consumers" of health care services, they certainly are not the purchasers. Purchasing is done in small part by patients, in larger part by employers, and increasingly by health care corporations, some of which have their origins and foundations in the insurance industry. The most competitive companies control very substantial market shares and therefore have a great deal of bargaining power, a power that is exerted over hospitals and physicians. Purchasing of health care services is actually being done in large contracts for tens of thousands and hundreds of thousands of patients at a time. More recently, the pharmaceutical industry has entered the field as a dominant force. Two large corporations, Merck & Co. and Eli Lilly, have purchased health care companies, and now have influence over at least prescriptions and potentially much more for nearly 100 million insured lives.[6] The practical significance of these shifts in health care purchasing is best depicted in those markets that are most affected. In some geographic areas, managed care contracts account for more than half of the health care services rendered. In extremely competitive markets such as California, a handful of companies control so much of the patient population, that physicians *must deal with them*. Unfortunately, some of the capitated plans that are offered under these conditions have trimmed physician reimbursement so close to the bone that even though they must, physicians *cannot afford to deal with them*. Viewed from the standpoint of the physician provider, it seems that little can be done to combat such adversity. However, vertical integration of vascular surgical, vascular and interventional radiologic, and other cardiovascular services into a single package with its own outcome and cost statistics renders the vascular center a well-positioned bargaining unit in a very competitive environment. This has been the philosophy and the experience of MVI.

Increase in practice mergers and establishment of networks. To combat the loss of bargaining power and the downward spiral in reimbursement, physicians have begun to merge practices and to form networks. In simplest terms, these maneuvers increase the ability of physicians to bargain with large health care purchasers within a geographic region. However, antitrust issues have resurfaced. Frustrated by their inability to bargain effectively with large health care companies, some physicians have already attempted to unionize.[7] In doing so, they have emphasized their firm belief that current antitrust law that prohibits physicians as independent contractors from collective bargaining is archaic, because for quite some time physicians have not been independent contractors who are in a position to fix prices. Instead, they have found themselves excluded from contracts with health maintenance organizations but without rights to appeal, or included in some contracts without clear peer-review procedures and without a defined mechanism of arbitration to resolve disputes between the organization and the physician. Although thus far attempts to unionize have not been rewarded with new legislation or favorable court rulings, the Florida branch of the Federation of Physicians and Dentists, a Tallahassee-based group affiliated with the AFL-CIO, is dedicated to advancing this cause. Although the outcome is uncertain, it appears that groups will continue to coalesce in some form or another. As they do, we believe that physicians with common interests, such as vascular surgeons and interventional radiologists, will take advantage of the opportunity by creating unique bargaining entities or by merging practices. The concept of the vascular center allows for merging of at least the peripheral vascular surgical and interventional portions of the respective surgical and radiologic practices. At MVI, substantial progress has been made in this direction in the area of aneurysm treatment. Other segments of practice may follow in the future. This concept is discussed further below. For now, suffice it to say that never before have there been such great technologic and economic pressures for vascular surgeons and interventionalists to combine. The institute environment creates an ideal opportunity for these dreams to be realized and for such groups to flourish.

Upcoming changes in the process for subcertification. In a recent issue of *The ABMS Record*, it

was stated that many American Board of Medical Specialties (ABMS) members and many members of ABMS' Committee on Certification, Subcertification, and Recertification (COCERT) believe that the Certificate of Added Qualifications, which was originally designed to curtail fragmentation of primary specialties, has failed to accomplish that goal. Therefore, in June 1994, COCERT met in a special session. Its preliminary report was presented to the ABMS in September of 1994. The report, which is divided into principles and recommendations, is quoted here directly from *The ABMS Record*[8]:

Principles:

- The certification process should permit movement of qualified individuals across specialties and subspecialties.
- Boards should continue to establish standards and educational and/or practice requirements for admission to their examinations.
- Physicians with knowledge, training, and/or experience in a given area deserve access to certification. The area of knowledge, training and/or experience may be within the purview of a board from which the physician has not received a certificate.

Recommendations:

- Certification other than general certification by an ABMS Member Board can be achieved through two pathways: a) A member Board may establish core requirements for the issuance of a certificate to holders of its general certificate. b) Two or more Member Boards may jointly establish core requirements for the issuance of an identical certificate.
- ABMS Member Boards should define the primary components of their specialties. Certification in a specialty or subspecialty should indicate mastery of the body of knowledge and skills in the defined components of the specialty or subspecialty.
- Each board should establish criteria by which physicians certified by other ABMS Member Boards may be awarded a certificate issued by that board. In such cases the board should use equivalent training, education, experience and knowledge as criteria for admission to their examination.
- With the institution of the new system, Certificate of Added Qualifications (CAQ) and Certificate of Special Qualifications (CSQ) will no longer be awarded.

The implications of the COCERT principles and recommendations are many and far-reaching. It is easy to imagine subspecialists from several disciplines (such as vascular surgery and vascular and interventional radiology) all engaging in the same type of dedicated practices, all sharing a common subspecialty certificate. How would the new system be handled at the training program level? Would it follow that individuals certified in vascular surgery will be qualified to take a fellowship in Vascular and Interventional Radiology and vice versa? Only time will tell.

LEADERSHIP OF VASCULAR CENTERS

The leadership and driving force in the MVI is and has been provided by vascular and interventional radiologists. Other specialists, including vascular surgeons, cardiovascular surgeons, cardiologists, and neurologists have willingly joined in and profited from this multidisciplinary effort. The result has been an improvement in patient care. Other organizational and leadership patterns for vascular centers may be equally effective and yet better suited to the local situation and personalities. For example, in other circumstances and locations, vascular centers have flourished under the leadership and driving force of a vascular surgeon, and a few vascular centers have been spearheaded by individuals with expertise in vascular medicine or cardiology. Finally, in some circumstances, the dominance and leadership functions may be shared equally between two or more of these specialties. All of these leadership paradigms for a multidisciplinary vascular center can be equally effective in providing cost-efficient, state-of-the-art quality patient care when the various specialists work well together and recognize each other's knowledge, skills, opinions, and needs. The essence of an effective Vascular Center depends more on interspecialty mutual respect and a sharing of responsibilities and resources than it does on which specialty is dominant in the leadership role.

THE FUTURE

What is the appropriate forum for discussion of the future of vascular and interventional radiology and vascular surgery, and the future of training in vascular therapeutics? What action can we take now to move forward? To address these topics, a summit meeting comprising vascular and interventional radiologists and vascular surgeons was recently conducted. A six-member task force representing the Society of Cardiovascular and Interventional Radiology met with a six-member task force of the International Society for Cardiovascular Surgery, North American Chapter. Although a resolution of training

issues for current trainees could not be achieved, a framework for further discussion was formulated and several areas for mutual cooperation were delineated:

- Joint sponsorship of NIH research initiative meetings (to begin in 1997)
- Evaluation of opportunities to cooperate jointly in educational endeavors
- Begin planning for joint or overlapping annual meetings in a common venue
- Form a standing committee to provide liaison
- Support the concept of the vascular center as a practice model of the future. This concept involves encouraging the development of five to 10 pilot centers around the country in which a unique practice environment will exist (for vascular and interventional radiologists and vascular surgeons already in practice, not those in training). As envisioned, leading physicians from each of these centers would submit their plans for a joint service, to include sharing of inpatient and outpatient care responsibilities, joint clinical decision making, performance of combined procedures, collection of data in a registry, and sharing of revenues.

Our experience at MVI supports the notion that today's problems represent the unique opportunities described herein. Because of our experience at MVI, we firmly believe that solutions will begin to emerge in vascular centers rather than in institutions whose leaders hold steadfastly to traditional specialty boundaries. In vascular centers the sharing of knowledge and skills will benefit patients and spur the evolution of the hybrid vascular specialist of the future.

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